



Columbia Area Community Food Assessment

Prepared by the Food Asset Mapping Team¹

Columbia, Missouri

May 2012

Overview

Columbia, MO is home to nearly 109,000 people² and is located near the midpoint between Kansas City and St. Louis along the Missouri I-70 corridor. Geographically, Columbia lies in southern Boone County, which has a total population of 162,642 living within in a 685 square mile area³. Columbia is a university town, housing the campuses of the University of Missouri, Stephens College, and Columbia College. Combined, the three colleges represent a population of approximately 36,000 students⁴.

This project was undertaken to look closely at the relationships among accessibility, availability, and affordability of healthy foods. A community's food environment includes the various places people purchase and grow food and the ways in which people travel to purchase food. Related issues include consumer decisions about food choices based on availability and affordability of foods and disparities in diet-related health conditions for people with different incomes or living in different areas of the community. The project included consumer surveys, price comparisons, and mapping techniques.

Collaborative Team

The Unite 4 Healthy Neighborhoods Food Asset Mapping Team (FAMT) is a collaboration of professionals, community leaders, and graduate students representing the PedNet Coalition, University of Missouri (MU) Extension Healthy Lifestyle Initiative-Boone County, the MU Center for Applied Research and Environmental Systems (CARES), and the Columbia/Boone County Department of Public Health and Human Services.

Consumer Surveys

Consumer surveys were conducted in the autumn of 2011 throughout the city of Columbia. Face to-face surveys were conducted at the Daniel Boone Regional Library, Columbia/Boone County Department of Public Health and Human Services, Oak and Paquin Towers, Wabash bus station, Columbia Housing Authority, and Shepherd's Basket Food Pantry. Over 20 community volunteers were trained to administer the surveys. An online version of the survey was also made available to the public

through a variety of outlets. In total, 774 surveys were completed, of which 145 were paper surveys and 629 were online surveys. See Appendix 3 for the survey.

Mapping

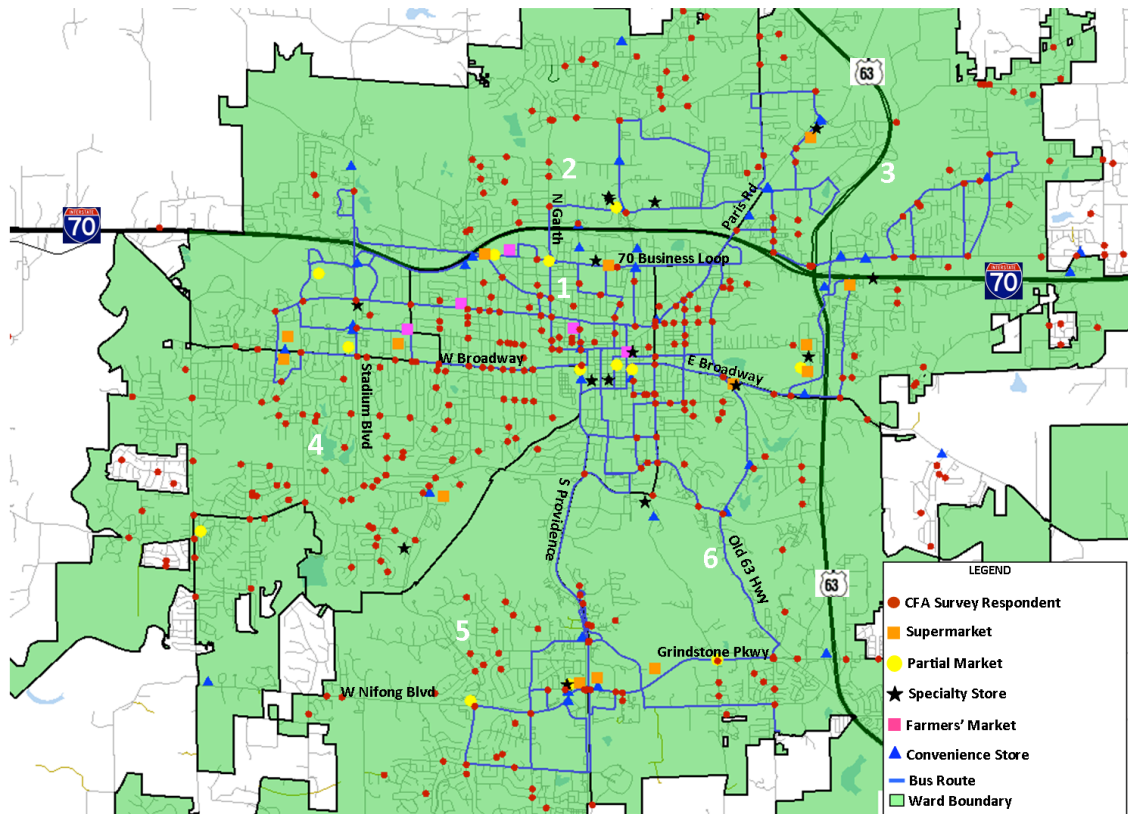
Geographic Information Systems (GIS) mapping is an important tool that can be used to gain a better understanding of the various components that comprise the food system in a particular area. Housed within the University of Missouri, CARES has developed a uniquely useful collaborative management system known as Community Issues Management (CIM), which allows for the storage and integration of information, and offers a GIS mapping tool that can access a host of national, state, county, and local data. CIM was used exclusively to create the maps contained within this report.⁵

Price Comparisons

Price assessments of various food stores were undertaken in early 2012. Using the USDA Thrifty Food Basket Plan (TFP) list of food items (see Appendix 1), prices were gathered at all supermarkets in Columbia and a sample of partial markets, specialty markets, and convenience stores where consumers indicated they shopped regularly for food. See Appendix 2 for list of stores.

For the purpose of this report, food stores were divided into four distinct categories: supermarkets, partial markets, specialty stores, and convenience stores. Supermarkets were defined as non-specialty food stores that were likely to provide access to a large majority of items from the TFP. Partial markets were defined as non-specialty stores that sold a range of items, including food. Specialty Stores were defined as food stores that marketed themselves as primarily selling natural/health foods, local foods, or ethnic foods. Convenience Stores were defined as multi-purpose stores that primarily sold gasoline, but also offered food items. Alternative food sources included food pantries, farmers' markets, personal/community gardens, free meal programs, produce auctions/stands, and Community Supported Agriculture (CSA) programs. Some respondents also regularly relied on friends, neighbors, co-workers, and relative as a food source. Map 1 displays the locations of these four store types within the city limits of Columbia.

Map 1: Survey Respondents, Food Stores, and Bus Routes Within Columbia City Limits



Note: In order to show the full extent of bus routes in the southern portion of the city, the top portion of the map was truncated, resulting in the erasure of several survey respondents and one supermarket at the edge of the city limits in northern Ward 2.

Consumer Survey Sample

Efforts were made to ensure a representative sample of Columbia's population during the consumer survey process. However, particular subsets of the population were overrepresented. Over 70% of respondents were female, and the average age was 43. There was a reasonably equitable representation of people between the ages of 18 and 84. Over half of the respondents were married or living with a significant other. Around 8% of those who completed the survey were African American, and 79% were Caucasian. Over 64% of the respondents were in households without children. Of those households without children, more than 62% had at least one person working full-time, while 16% had no one employed. Of the households with children, 82% had at least one full-time worker.

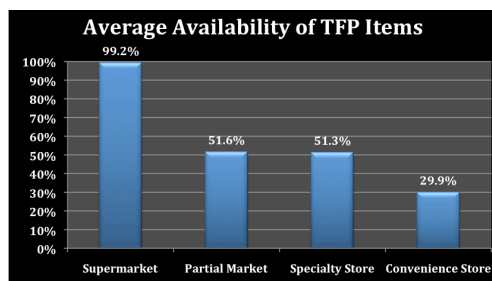
The survey sample population had a high percentage of college and graduate school degrees (64%), while 9% had less than or equal to a high school education. As previously mentioned, Columbia is a university community with a large undergraduate, professional, and graduate student population. It is reasonable to consider that some respondents in student-heavy residential areas may have additional access to resources for food, transportation, and income (e.g., university meal plans, parents/guardians). Since the survey did not ask respondents whether they were currently students, results should be considered in light of the diverse Columbia population.

Over 60% of respondents provided information about the location of their residence. Nearly 13% were from Ward 1, 8.3% were from Ward 2, over 12% were from Ward 3, and 14.5% were from Ward 4. Seven and one half percent (7.5%) of respondents lived in Ward 5, and over 8% were from Ward 6.

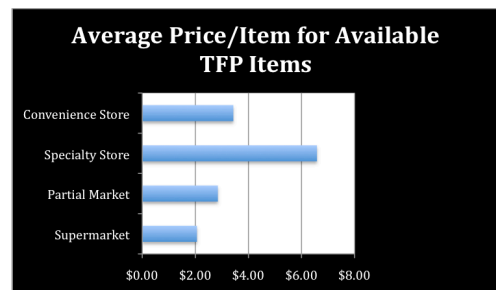
Availability and Affordability of Food Items

Price surveys at all supermarkets and a sample of other food stores revealed many differences in the availability of staple food items. Overall, supermarkets stocked most items, while partial markets and specialty stores, on average, sold around half of the items.

Convenience stores that were surveyed sold around 30% of food items from the TFP market basket. Since availability



of items varied among store types and the prices among different items varies (e.g., loaf of bread vs. gallon of milk) it is hard to compare the total price of complete market baskets. However, the average



price per item based on what was available at the stores, provides a way to compare affordability and availability among stores surveyed. Supermarkets were the most

affordable (\$2.06/item), followed by partial markets (\$2.85), convenience stores (\$3.43), and specialty stores (\$6.58).

No information about food quality was collected, although 59.6% of households stated they thought supermarkets had the highest quality of food, while 29.3% of households chose specialty stores

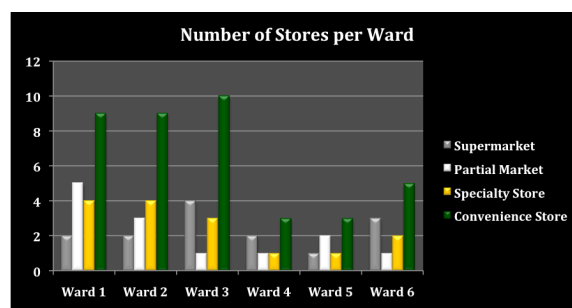
for their quality. Availability and affordability will be discussed in further detail in relationship to consumer decisions about their food choices.

Availability of Food Stores

As the maps depicting Columbia's food stores illustrate, each of the city's wards contains at least one of each type of store. Supermarkets are distributed throughout the city as follows: 2 in Ward 1; 2 in Ward 2; 4 in Ward 3; 2 Ward 4; 1 in Ward 5; and 3 in Ward 6. In total, there are 15 supermarkets present within Columbia city limits. Thirteen partial markets can also be found within Columbia, distributed as follows: 5 in Ward 1; 3 in Ward 2; 1 in Ward 1; 1 in Ward 4; 2 in Ward 5; and 1 in Ward 5. Fifteen specialty stores are dispersed throughout the city, with the majority (8) being found in Wards 1 and 2. Thirty-nine convenience stores are located within the city, but their distribution is highly uneven. Wards 1, 2, and 3 contain 2.5 times the number of convenience stores (28 total) that are present in Wards 4, 5, and 6 (11 total).

Map 2 shows that the overwhelming majority of convenience stores are located either within or bordering those areas of the city with child poverty rates of at least 14%. This is an important feature to note, given that people without adequate access to transportation tend to shop at stores within walking distance. Over 11% of Ward 1 households shopped at convenience stores because it was the closest store to their home.

Since it has been shown that convenience stores have an extremely limited selection of items from the TFP list, it is fair to conclude that individuals who rely on these types of stores for the majority of their food purchases are likely to have less healthy diets than those with access to stores with a larger selection of healthy items.

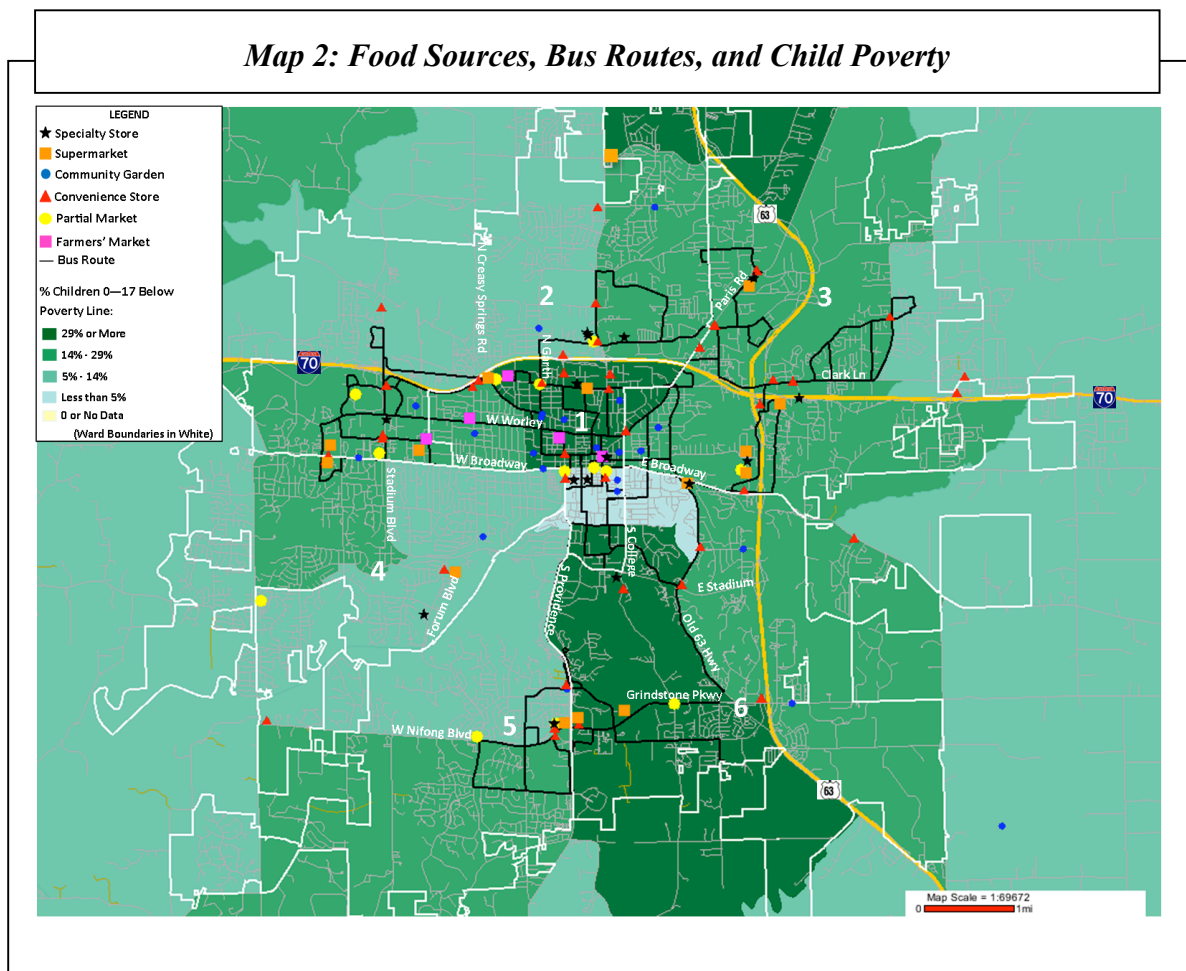


Additionally, large portions of several wards are barren of any type of store. The food purchasing behavior of individuals living in these areas may be negatively impacted due to this lack of nearby access to food, particularly when coupled with a lack of access to transportation.

Use of Food Stores and Distance Traveled By Ward

Most households shopped at supermarkets regularly to purchase food items. However, only 64% of survey respondents from Ward 2 said they used supermarkets. This may be related to the fact that 15.6% of households from Ward 2 stated they had to travel more than 3 miles to a supermarket.

Around 33% of households from Wards 1 and 6 used partial markets regularly to purchase food items. Over 48% of Ward 1 households and 33% of Ward 6 households reported that partial markets were located within one mile of their home.



Households from Ward 4 reported the highest use of specialty markets (44.6%), even though 78.5% of households reported that the store was more than one mile from their home. While 59% of Ward 6 households reported that a specialty market was located within one mile of their home, only 26%

shopped there regularly.

Over 8% of Ward 1 and Ward 5 households regularly purchased food at convenience stores. In Ward 1, this is likely related to the fact that 87% of households reported living within half of a mile to a convenience store.

Use of Food Stores and Distance Traveled By Income

Over 28% of households reporting income between \$30,000-\$34,999 lived within ½ mile of a supermarket, and 37.5% of households reporting income between \$40,000-\$44,999 lived between ½ mile and one mile of a supermarket. The highest percentage of households living between one and 3 miles from a supermarket was households earning between \$5,000-\$9,999 (32.8%).

The highest use of partial markets was among households earning less than \$15,000 annually (44%), with the next highest group earning between \$15,000-\$30,000 (36%). Around 9% of households earning less than \$15,000 lived within ½ mile of a partial market.

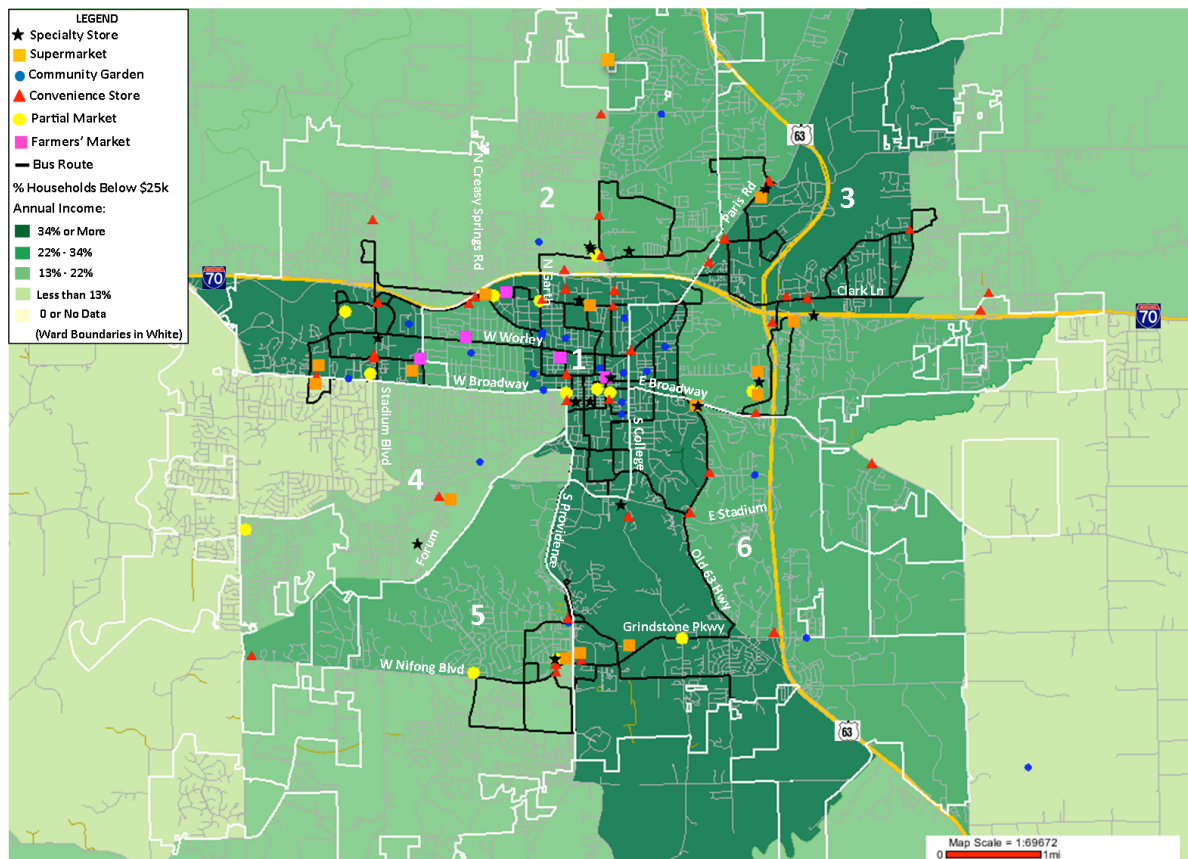
The highest use of specialty stores was among households earning between \$25,000 and \$29,999 (57.9%), even though 62.7% traveled more than one mile to a specialty store. Households earning between \$40,000 and \$44,999 reported the next highest use of specialty stores (37.5%). Households earning between \$30,000 and \$49,999 had the most households living within ½ mile of a specialty store.

Accessibility

For those without access to a personal vehicle, public transportation is likely to serve as the only viable option to reach a food store located beyond a 1-mile radius from an individual's home. Map 3 includes the entirety of the bus routes for the city of Columbia. As can be seen, the central portion of the city, primarily Ward 1, is regularly intersected by a number of bus routes, and extended routes branch out into other neighborhoods in non-centralized areas of the city's remaining 5 wards.

Bus routes service the majority of the low-income regions of the city, however, most residential areas within close proximity to the boundary of the city limits are not serviced. Additionally, with the exception of Ward 1, large swaths of residential areas in the remaining wards do not have readily available access to a bus route. For middle and higher income areas, such as is seen largely throughout

Map 3: Food Sources, Bus Routes, and Households With Incomes Below \$25,000



Ward 4 and Ward 5 (see Map 4), this is unlikely to stand as a substantial food access barrier to residents, but in lower income portions of the city such limitations could result in considerable food access obstacles.

Transportation to Stores by Ward

Over 4.7% of Ward 2 households and 3.1% of Ward 1 households walked to the supermarket to purchase their food. Over 12.5% of Ward 1 households and 5.4% of Ward 3 households took the bus.

Many households opted to take a free ride from a relative or friend to purchase food from the supermarket. This occurred most in households from Ward 3 (6.5%), Ward 1 (5.2%), and Ward 6 (4.6%).

Ward 1 households often walked to partial markets (23.5%). Biking was more common for Ward 5 households (9.1%). Households from Ward 1 (8.8%) and Ward 5 (9.1%) used the bus to shop at partial markets.

Nearly 16% of Ward 1 households who shopped at specialty stores walked there, while 18.4% rode a bike. Ward 3 households often biked to specialty stores (10%) or shared a free ride with a friend or relative (6.7%).

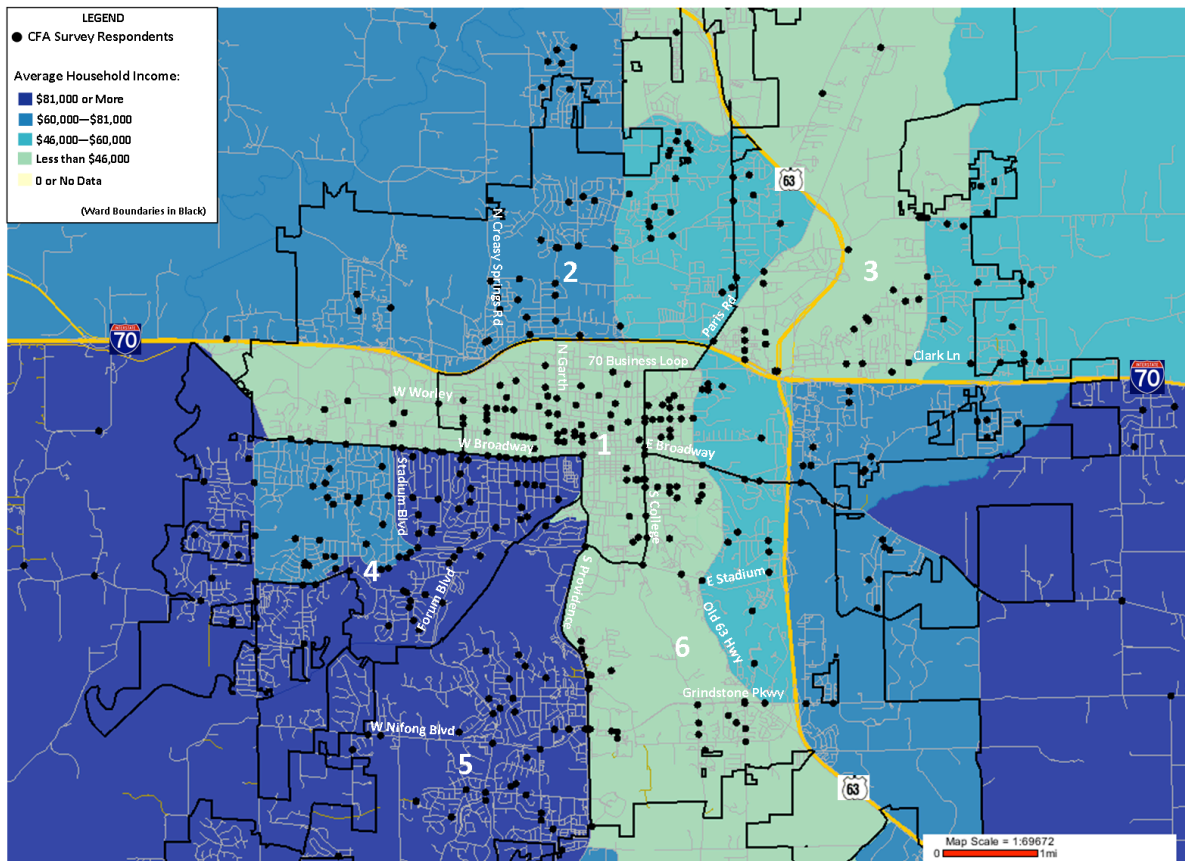
Half of Ward 1 households who shopped at convenience stores walked there, while 22.8% of Ward 5 households who purchase food at convenience stores traveled by bus. Almost 19% of households from Ward 3 that purchase food at convenience stores walked there, while 12.5% used a bike as their primary mode of transportation.

Transportation to Stores by Income

Households earning less than \$5000/year had the highest percentage of households that walked to supermarkets (9.1%), took the bus to supermarkets (24.2%), and received a free ride from a relative or friend (15.2%). Those earning between \$10,000 and \$14,999 and over \$50,000 reported the highest percentage of biking as the mode of transportation to supermarkets.

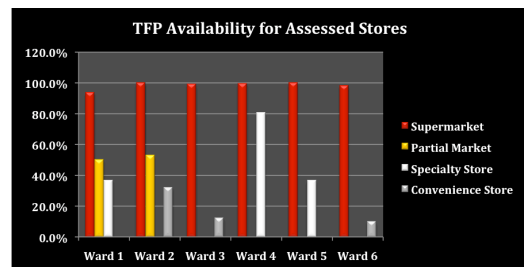
Over 18% of households earning less than \$5000/year walked to partial markets, and 9.1% took the bus. The highest percentage of households relying on friends or relatives to drive them to partial markets was households earning between \$10,000 and \$14,999. Biking to partial markets was most common for households earning between \$20,000 and \$24,999 (5.3%).

Map 4: Consumer Survey Respondents and Average Household Income



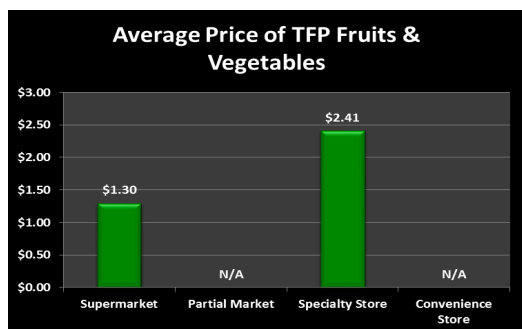
Availability and Affordability of Food at Food Stores

Households make decisions regarding food choices based on a number of factors. This includes the availability of food stores, the accessibility of food stores, and the affordability of food items at the various stores. The availability of specific foods differed amongst the different types of stores. The graph to the right shows the availability of all items in the TFP that were audited. It is important to note that not all partial markets, specialty markets, or convenience stores in all 6 Wards were surveyed. There was a great difference in the availability of items in specialty stores, with specialty stores in Ward 4 offering the most TFP items. Generally, supermarkets, partial markets, and convenience stores were similar across



geographic areas.

Differences amongst households living in different wards and households earning different income levels exist. Households generally shopped at supermarkets for the lowest prices. However, 3.1% shopped at partial markets because of the perception of low prices, with the highest percentage from Ward 6 (9.2%).



The graph on the left shows the average price of available fresh fruits and vegetables at the stores surveyed. Neither convenience stores nor partial markets had fresh fruits and vegetables on the day that surveys were conducted. While nearly 80% of households shopped for fresh produce at supermarkets, over 7% of Ward 1 households shopped for produce at partial markets. Over 10% of all households bought produce at specialty stores, with the highest percentage coming from Ward 4 (16.1%).

Health and Food Security

In the U.S., the term that is used to describe access by all people at all times to enough food for a healthy lifestyle is food security. Food insecure households adjust their diets by skipping meals, reducing food intake, or purchasing foods that cost less, but are not necessarily healthy, of high quality, desirable, or varied. Food insecure households are generally consuming “less-than-optimal food and nutrient intake” and are at “risk for nutrient deficiencies” which is often related to reduced intake of fruits and vegetables⁶. The USDA recommends eating between two and four servings of fruit each day and between three and five servings of vegetables each day.⁷ Diet-related diseases include heart disease, high cholesterol, and high blood pressure.

Nearly 19% of those surveyed were categorized as having low food security, while almost 9% were very low food secure (formerly food insecure with hunger). This is higher than the 2010 Missouri Hunger Atlas Boone County estimates of 12.3% food insecure and 4.6% food insecure with hunger. It is also higher than the USDA state estimate of 15.8%.⁸ The largest percentage of households surveyed that were low food secure were in Wards 1 (24.7%), 3 (28.1%), and 6 (20.5%). The largest percentage of

households surveyed that were very low food secure, which is of the utmost concern were households in Wards 2 and 6 (both 14.3%), and Wards 1 and 3 (around 12.5%).

Around 8% of survey respondents reported having diabetes themselves and 5.6% reported another household member having diabetes. Ward 1 had the highest percentage of diabetics (11% of respondents, 6% of other household members). Around 21% of respondents reported having high cholesterol and high blood pressure. Ward 3 had the highest percentage of respondents with high cholesterol (28.1%) and high blood pressure (31.3%).

Households often relied upon alternative food sources to meet their dietary needs this past year. Almost 14% of those surveyed used food pantries, with the highest percentage in Ward 1 (31.9%) and Ward 3 (24.2%). Around 2.7% used free meal programs, overrepresented by Ward 1 (9.3%), Ward 3 (7.4%), and Ward 6 (6.3%). Over 13.6% of respondents used the National Free and Reduced School Lunch and Breakfast Program. Nearly 72% had been to a farmers' market this year. Ward 4 had the highest percentage of households who visited the farmers' market one or more times each month (15.5%). The lowest overall usage was in Ward 6 (61.5%) and Ward 2 (67.2%). Over 36% purchase food at a produce stand or auction. This was highest for Ward 4 respondents (43.8%). Around 46% of households surveyed had a personal garden or community garden plot. The highest percentages were in Wards 4 (59.8%) and 1 (51%). The lowest was in Ward 5 (29.3%) and Ward 6 (30.8%). Nearly 13% participated in a Community Supported Agriculture (CSA) program, with the highest percentage in Ward 1 (25%) and Ward 4 (17.9%). Twenty-two percent of households surveyed obtained food through hunting and fishing. Over 45% received food from relatives. Almost 53% received food from friends, co-workers, or neighbors. Twenty percent of Ward 1 households relied on this food more than one time per month, as did 21.5% of Ward 6 households.

Many significant differences existed in food security status, health status, and fruit/vegetable consumption when food sources were considered. Below is a summary of selected findings.

Food Security

- 18.4% of non-food pantry users were low food secure and less than 1% were very low food secure. 28.2% of food pantry users were low food secure and 36.4% of pantry users were very low food secure.
- 23.3% of non farmers' market users were low food secure and 19.4% were very low food secure. 18.2% of FM users were low food secure and less than 1% of FM users were very low food secure.
- 21.2% of non-gardeners were low food secure and 12.3% were very low food secure. 17.7% of gardeners were low food secure and less than 1% of gardeners were very low food secure.
- 23.8% of those receiving food from relatives were low food secure and 10.3% of those receiving food from relatives were very low food secure.

Fruit/Vegetable Consumption

- Food pantry users consumed an average of 1.33 fruit servings each day, compared to 1.77 for non-users. They consumed an average of 2 servings of vegetable servings each day compared to 2.42 servings for non-users.
- Farmers' market users consumed an average of 1.81 fruit servings each day, compared to 1.46 for non-users. They consumed an average of 2.51 servings of vegetable servings each day compared to 1.97 servings for non-farmers' market users.
- CSA users consumed an average of 1.88 fruit servings each day, compared to 1.67 for non-users. They consumed an average of 2.86 servings of vegetable servings each day compared to 2.28 servings for non-users.

Diet-Related Diseases

- 23.4% of non-gardeners had high blood pressure, while 16.8% of gardeners had high blood pressure.
- 23.6% of non-CSA users had high cholesterol, while 13% of CSA users had high cholesterol.

- 21.2% of non-CSA users had high blood pressure, while 12% of CSA users had high blood pressure.
- 7.2% of non-hunting/fishing users had diabetes, while 12.1% of hunting/fishing users had diabetes.
- 6.2% of non-pantry users had diabetes, while 21.8% of pantry users had diabetes.
- 20.5% of non-pantry users had high cholesterol, while 32.7% of pantry users had high cholesterol.
- 17.2% of non-pantry users had high blood pressure, while 39.6% of pantry users had high blood pressure.

Summary

The Columbia Area Community Food Assessment is an important starting point for people to begin understanding certain aspects of the complex food system. It points to potential geographic and economic barriers facing individuals and households that may be considered for future efforts to improve equitable access to healthy foods. Consumers described a number of methods used to supplement food purchased at food stores, as well as a number of factors related to transportation, cost, quality that impacted decisions they made about where to purchase food and what types of food to purchase. Within the Columbia area, many diverse food store options exist, but health concerns are great, especially among food insecure households. This report may be useful as a guide to being targeting health-related concerns in the community as it relates to diet and access to healthy foods.

Recommendations

Recent studies have found that simply ensuring accessibility to stores with healthy food options, through such approaches as bringing Supermarkets to food deserts, is not enough to change purchasing and eating behaviors.^{9,10} Addressing the three major factors that influence food behavior can create sustainable solutions and long-term change. Access is only one part of the problem. Affordability and education must also receive equal attention.

Locally, one such attempt has been made in the form of a pilot program known as Access to Healthy Foods (AHF). AHF was begun in 2011 through a partnership between the PedNet Coalition, the Columbia Farmers' Market, Sustainable Farms & Communities, and the Columbia/Boone County Health Department. The program allowed qualified low-income individuals and families to double the value of each dollar, up to \$25, when shopping at the Columbia Farmers' Market (located in the southwestern portion of Ward 2). Though access to the market for low-income residents may have been somewhat limited, the program did make healthy food choices more affordable. Additionally, cooking classes were offered to program participants in an effort to offer food preparation education. Future, larger-scale efforts in this arena should seek to incorporate a similar, multi-pronged approach to the issues of promoting food security and healthy eating habits in Columbia.

Continuous efforts to obtain the perspectives of producers, distributors, and retailers is important to gain further understanding of the community's food system. Questions addressing economic development, social justice, and food safety should be included in subsequent food systems work in Columbia.

¹ Report written by Michelle L. Kaiser, PhD, MSW, MPH and E. Matthew Bethurem, MPPA, MPH with contributions from Joe Neville, MA. All maps created by Bethurem using CIM. Data analyzed by Kaiser, Neville, and Bethurem. Project supervision by Vera Massey, MS (MU Extension), Erin Barbaro, MA (CARES), and Sam Robinson (PedNet).

² United States Census Bureau. (2012). *2006-2010 American Community Survey*. Retrieved from <http://quickfacts.census.gov/qfd/states/29/2915670.html>

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⁴ City-data.com. (2012). Retrieved from <http://www.city-data.com/city/Columbia-Missouri.html>

⁵ Data Sources: 2006-2010 American Community Survey, Yellow Pages, Google Maps, ground truthing

⁶ American Dietetics Association [ADA]. (2010). Position of the American Dietetics Association: Food insecurity in the United States. *Journal of the American Dietetics Association*, 110, page 1369.

⁷ United States Department of Agriculture (2012). *Nutrition and Your Health: Dietary Guidelines for Americans*. Retrieved from <http://www.nal.usda.gov/fnic/Fpyr/pmap.htm>

⁸ Dawdy, J., Foulkes, M., Heflin, C., Hermesen, J., Lucht, J., Raedeke, N., & Rikoon, J.S. (2010). *Missouri Hunger Atlas*. Retrieved from <http://www.missourifamilies.org/mohungeratlas/counties/index.htm>

⁹ Lee, H. (2012). The Role of Local Food Availability in Explaining Obesity Risk Among Young School-Aged Children. *Social Science & Medicine*, 74, 8, 1193 - 1203.

¹⁰ Drewnowski, A., Aggarwal, A., and Vernez Moudon, A. (2010). *The Supermarket Gap: How to Ensure Equitable Access to Affordable, Healthy Foods*. Retrieved from <http://depts.washington.edu/uwcpn/reports/cphnbf051910.pdf>